Danish seine - An environmental friendly fishing method?

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An Environmental Friendly Fishing Method?

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Background

Although extensive research is devoted to assess the effects of demersal trawling on the marine ecosystem, only a handful of studies considered the Danish seine (*ICES, 2010*) – an encircling net to catch demersal fish (*Sainsbury, 1996*). By EU legislation, trawls and seines belong to one category and thus follow the same regulations, although there are differences between both gears, such as the lighter construction of seines and no use of heavy weights or doors. This results in a moderate fuel consumption of seines (*Suuronen et al., 2012*) and probably in relatively low interactions with the seabed. Furthermore, the fishing process is considered to be more gently which may increases the chance of discarded fish to survive (*Revill, 2012*). In total, the seine is regarded as a relatively ecofriendly fishing gear.

Since these statements are only based on a few scientific investigations and many assumptions, this study will test the environmental friendliness of Danish seines compared to trawls and – if necessary – try to improve its properties, e.g. selectivity and bottom impact. This will be done by an analysis of existing catch data (Danish observer program from 1997 to 2012; DOP) and following field trials.

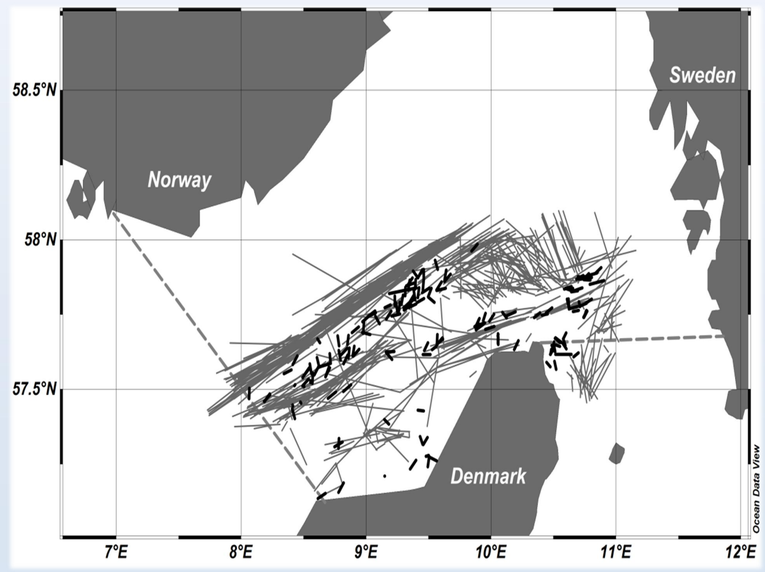

Figure 1: Valid Hauls of DOP (n_{seine}=285; n_{trawl}=466). ━ Danish seine stations. ── Trawl stations.

First results

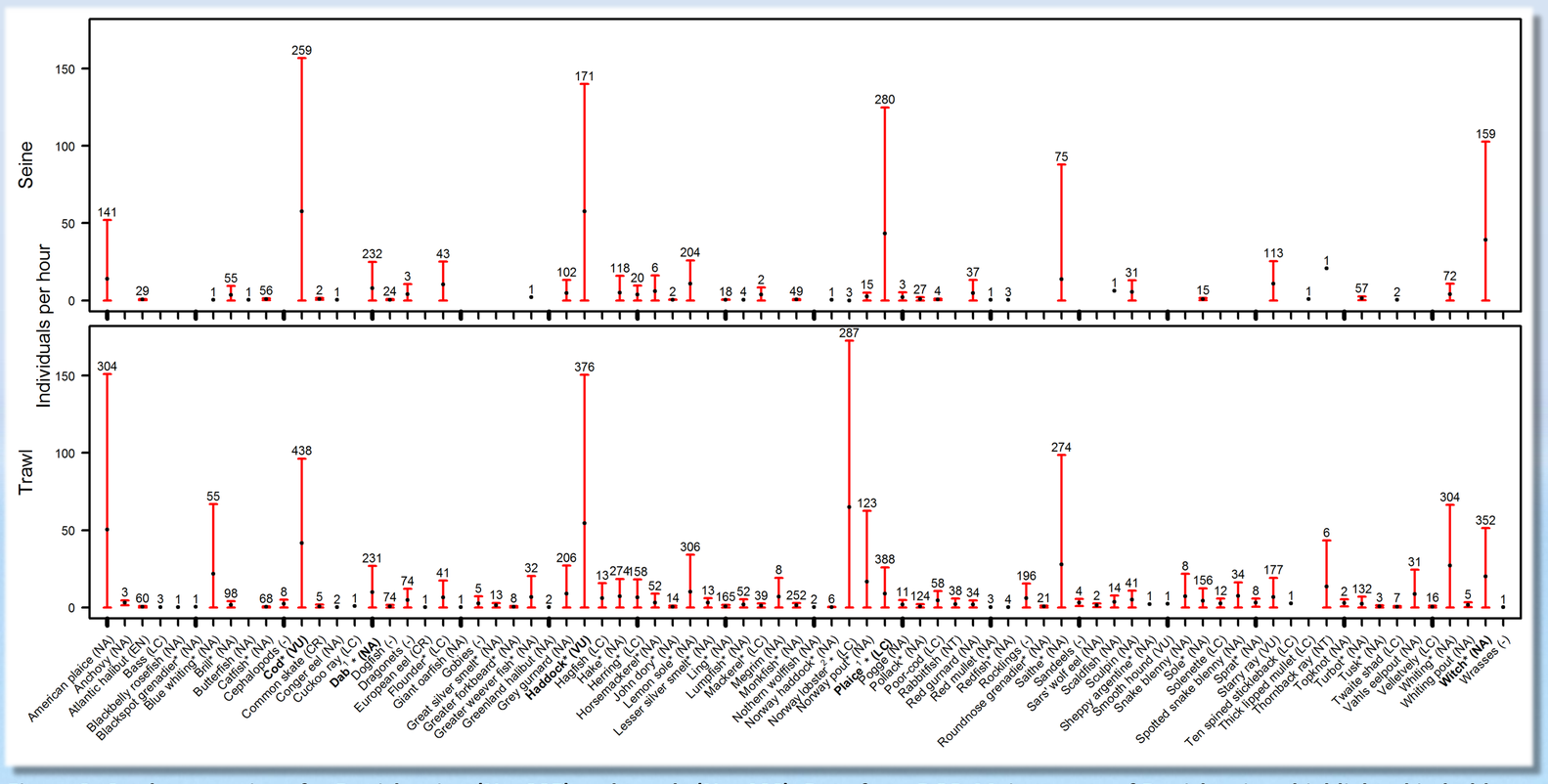

Figure 2: Catch comparison for Danish seine (N = 285) and trawls (N = 466). Data from DOP. Main targets of Danish seines highlighted in bold. Black dots indicate mean catch per hour, red bars indicate standard deviation and number on top shows number of hauls where this species occured. * indicates mention on list of future discard ban (*EEC 2012*). Letter combination shows conservation status after IUCN (NA = not assessed, LC = least concern, NT = near threatened, VU = vulnerable, EN = endangered, CR = critically endangered). [1] and [2] indicate reduction of catches by the factor of 10 or 20 due to very high catch rates.

A first analysis of the DOP data (**Fig. 2**) shows that the diversity of catches in Danish seines (46 species) is lower than in trawls (78 species). The mean number of individuals per hour of species, targeted by Danish seiners, is slightly higher for Danish seines in most cases. However, the high standard deviations cause a high degree of uncertainty for most species. The high difference between the gears for Norway lobster is caused by the fact that it does not belong to the targets of Danish seiners, but it is one of the main targets of trawlers.

Seven species, caught by Danish seines are classified at least as “near threatened” by IUCN (International Union for Conservation of Nature). This list is extended by two species for trawl catches.

Future tasks

1. Process description (Start:2014)

Detailed description of all stages of the seining process concerning geometry and forces by Dataloggers for depth, relative distance, tilt, speed, …

2. Selectivity (Start:2014)

Experiments to support existing data by usage of codend cover and special collecting bags to estimate vertebrate species as well as invertebrate species.

3. Benthic impacts (Start:2015)

Estimation of potential interactions of the gear with the sea bottom by using physical (e.g. Sidescan sonar) and biological methods (e.g. grab samples).

4. Discard Survival (Start:~2015)

Assessment of discarded fish´s chance to survive, which is important in terms of the future discard ban in European fisheries.

5. Fish behavior (Start: ~2015)

Observing behavior of fish during stages of the capture process with the aim to improve catch efficiency and selectivity of the gear.

Combination of all tasks to provide an overall picture of ecosystem effects of Danish seine fishing

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